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Appl. No. : 10/694,646
Applicants : Anuja Patel, Jianhau Yang
Filed : October 27, 2003
Art Unit : 3736
Examiner : George P. Wyszomierski
Title : LONG FATIGUE LIFE NITINOL

Docket No.: : PARCR-65197
Customer No. : 24201

SUPPLEMENTAL DECLARATION OF CRAIG MAR
UNDER 37 C.F.R. § 1.132

Dear Sir:

I, Craig Mar, hereby declare as follows:

1. I have read the Advisory Action from the Patent Office examiner dated December 10, 2007, in which he raised two questions in connection with my 1.132 declaration of November 19, 2007.
2. I submit this supplemental declaration to address the examiner's questions from the Advisory Action and in support of applicant's Response to the final Office action mailed September 24, 2007, to overcome the examiner's rejections.
3. In paragraph a) of the Advisory Action, the examiner noted the difference between the 16,560 cycles to failure for standard nitinol wires which applicant asserted was comparable to the Beard reference fatigue data, which reference showed in para. [0006] "several hundred cycles at 6% strain, 10,000 cycles at 2% strain, and 1,000,000 cycles at 0.5 % strain." The difference in the fatigue test data was attributable to the

different test methods. As I stated in my November 19 declaration, paragraph 9, the 16,560 cycles to failure was determined under a "rotary beam test," while the test data from Beard was based on what I believe, as a person having ordinary skill in the art, to be a cyclical "tensile fatigue test." I draw this conclusion -- although the reference does not explicitly state it -- because the other properties mentioned in Beard such as Young's modulus, yield strength, ultimate tensile strength, and elongation only make sense in reference to standard tensile testing. Also, since the rest of the test data in the Beard tables have a caption "typical tensile properties" of nitinol alloys, it logically follows that the relevant test data were based on tensile testing. Finally, from my work with nitinol alloys, the fatigue test data given in the Beard tables appear typical for standard nitinol wire. Therefore, I maintain that the 16,560 cycles to failure under a rotary beam test is representative of standard nitinol wire, which is comparable to the Beard nitinol wire described in the data tables.

4. In paragraph b) of the Advisory Action, the examiner notes the 380,000,000 cycles to failure that I raised in paragraph 9 of my declaration versus the 22,760 cycles to failure mentioned in the specification. The explanation for this difference is the same as before: the 380,000,000 cycles is fatigue life based on a cyclical tensile fatigue test of the formed nitinol wire device while the 22,760 cycles is based on a rotary beam test of the straight nitinol wire.

5. Paragraph [0033] of the specification explains what a rotary beam fatigue test is, and paragraph [0036] explains what a cyclical tensile fatigue test (also called a "coupon fatigue test") is.


6. Furthermore, in paragraph [0036] of the specification, applicant presented fatigue test data for "standard nitinol wire" that underwent cyclical tensile fatigue testing. The "standard nitinol wire" sample was placed under 0.9% to 1.4% strain and failed at 32,000 cycles. This fatigue life is within the "ballpark" of the Beard fatigue life test data at 10,000 cycles at 2% strain and 1,000,000 cycles at 0.5% strain. Therefore, in the

context of cyclical tensile testing, standard nitinol wire such as the Beard wire failed at 32,000 cycles while the claimed invention nitinol wire failed at 38,000,000 to 48,000,000 cycles. Further experience in processing the inventive nitinol wire has enabled my company to achieve greater than 380,000,000 cycles to failure as mentioned in paragraph 9 of my declaration.

7. As for support data, I have attached eight pages from the engineering notebook of Anuja Patel, one of the named inventors. I declare that the attached eight pages are true and accurate copies of Anuja Patel's engineering notebook. The notebook shows rotary beam fatigue testing on 0.013-inch diameter nitinol wire of the present invention at 0.75% strain, resulting greater than 22,670 mean cycles to failure (see center column in each table under caption "Cycles."). This represents a dramatic 37% improvement in fatigue life over standard nitinol wires that were rotary beam fatigue tested to only 16,560 cycles to failure.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of inventor: CRAIG MAR

Declarant's signature: 

Date: January 4, 2008

Residence: Fremont, California

Citizenship: United States of America

Post Office Address:

932 Praderia Circle
Fremont, CA 94539

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